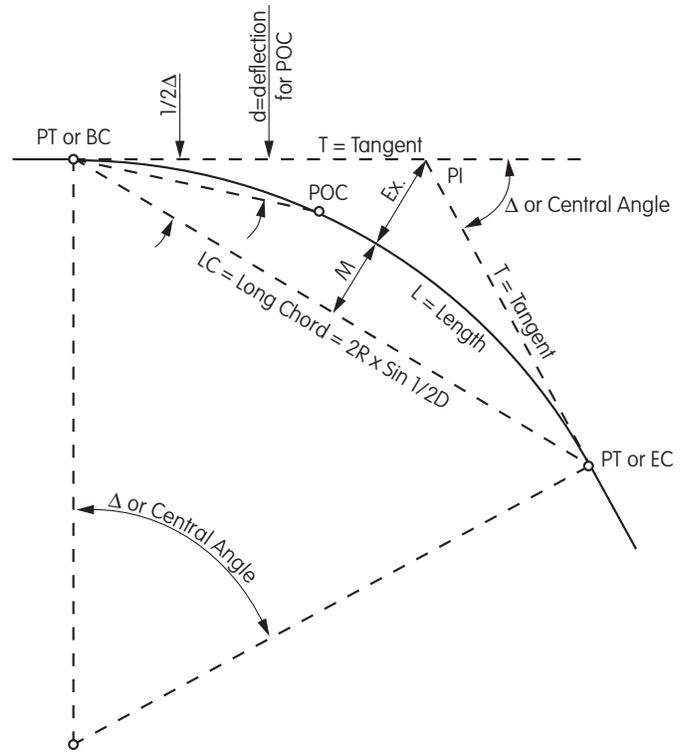


Curve Functions

- R = Radius
- T = Tangent Distance
- PC = Point of Curvature
- PT = Point of Tangency
- Ex. = External
- L = Length of Curve
- LC = Long Chord
- PI = Point of Intersection
- D = Delta or Central Angle
- d = Deflection for Point on Curve
- M = Middle Ordinate



Curve Data required are: Δ, Radius, Tangent, Length and External, obtained as follows;

$$D = \text{Given}; \tan \frac{1}{2}\Delta = \frac{T}{R}$$

$$D \text{ in degrees} = \frac{L \times 3,437.7467}{R}$$

$$R = \text{Given}; R = \frac{T}{\tan \frac{1}{2}\Delta}$$

$$T = R \tan \frac{1}{2}\Delta$$

$$\text{or } L = L = \frac{2\pi R \Delta}{360^\circ} \text{ R func D. See Length of Arc Table on page 2-2.1.}$$

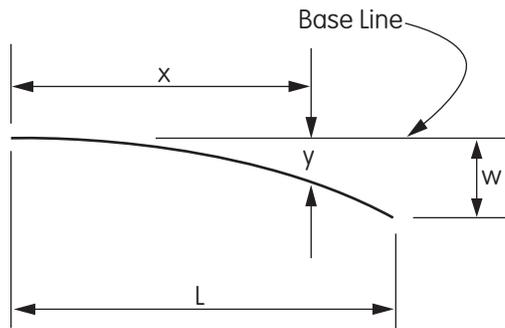
$$Ex = R \text{ exsec } \frac{1}{2}\Delta; M = R \text{ vers } \frac{1}{2}\Delta$$

$$d(\text{min}) = \frac{1,718.88}{R} \text{ arc length, see Deflection and Chord Table on page 2-3.1.}$$

$$\text{exsec} = \sec - 1 = \frac{1}{\cos} - 1$$

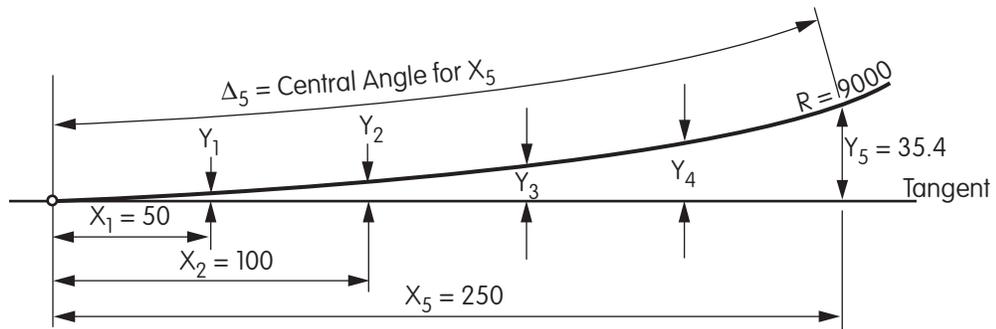
$$\text{vers} = 1 - \cos$$

Curve Formulas



$$y = \frac{wx^2}{L^2}$$

L = Length of flare
 w = Maximum offset
 x = distance along base line
 y = Offset from base line



Given: R and X

Sought: OFFSET Y

Note: For approximate results the simpler formula

$$(1) \text{SIND} = \frac{X}{R}$$

$$\left(Y = \frac{X^2}{2R} \right)$$

$$(2) Y = R \text{ VERS } \Delta = R (1 - \text{COS } \Delta)$$

Given: Y and X

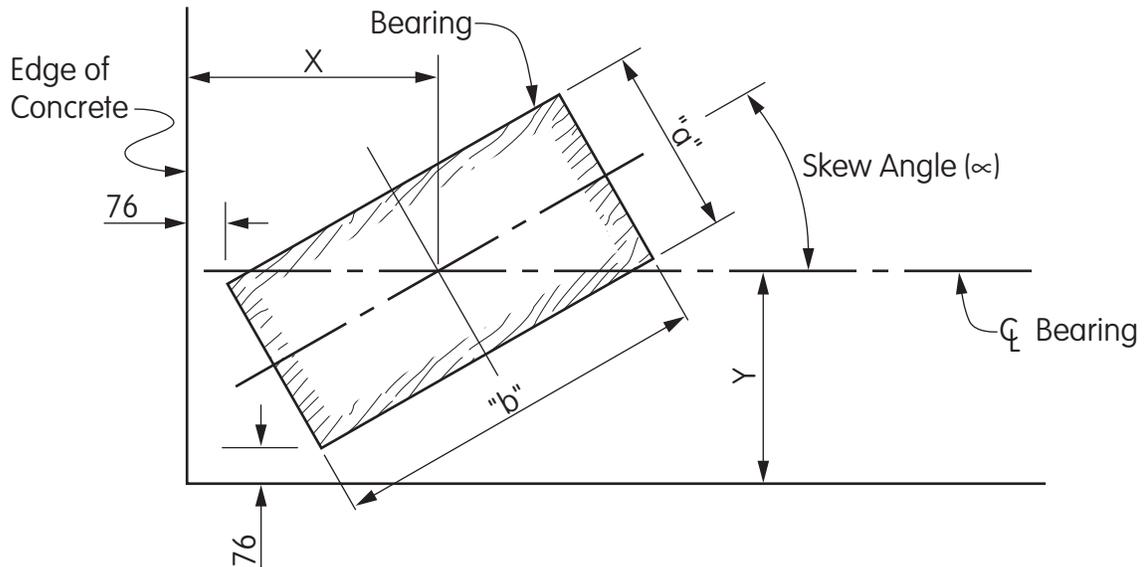
Sought: R

may be used. (The error is 1% when X = 0.2R) This table may be used for other Radii by moving the decimal equally in R, X, and Y.

$$(1) \text{TAN } \frac{\Delta}{2} = \frac{Y}{X}$$

$$(2) R = \frac{X}{\text{SIN } \Delta}$$

Edge Distance for Bearings



Formula

$$"Y" = 76 + \frac{"a"}{2} \cos \infty + \frac{"b"}{2} \sin \infty$$

$$"X" = 76 + \frac{"a"}{2} \sin \infty + \frac{"b"}{2} \cos \infty$$

Example

Given

10 ∞ 22 Bearing ("a" = 254; "b" = 559)

Skew Angle (∞) = 27° 10' 30"

Calculate

$$"Y" = 76 + \frac{254}{2} (0.88961574) + \frac{559}{2} (0.45670980)$$

$$= 76 + 113 + 128 = 317; \text{ use } 318 \text{ minimum}$$

$$"X" = 76 + \frac{254}{2} (0.45670680) + \frac{559}{2} (0.88961574)$$

$$= 76 + 58 + 253 = 383; \text{ use } 381 \text{ minimum}$$